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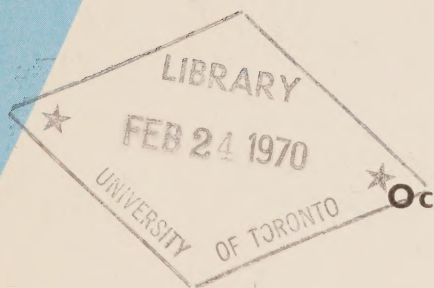


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DEPARTMENT OF ENERGY, MINES AND RESOURCES  
Ottawa



## SCOTIAN SHELF Two Surveys

June 3 to June 6, 1968

October 16 to October 29, 1968

### No. 9

1969 Data Record Series

# Canadian Oceanographic Data Centre

Programmed by the  
Canadian Committee on Oceanography

1969



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# **SCOTIAN SHELF**

## **Two Surveys**

**June 3 to June 6, 1968**

**October 16 to October 29, 1968**

**CODC References: 10-68-017**

**10-68-003**

### **No. 9**

**1969 Data Record Series**

**DEPARTMENT OF ENERGY, MINES AND RESOURCES**

**Canadian Oceanographic Data Centre**

**615 Booth St., Ottawa, Canada**

**Programmed by the Canadian Committee on Oceanography**





PART I

by

CSS "Dawson"

(CODC Reference 10-68-017)





DEPARTMENT OF ENERGY, MINES AND RESOURCES  
and  
FISHERIES RESEARCH BOARD OF CANADA

SCOTIAN SHELF (Part I)

Ship:	CSS "Dawson"
Local cruise designation:	BI 2568
CODC cruise reference no:	10-68-017
Cruise period:	June 3 - June 6, 1968
Officer-in-Charge:	T.R. Foote
Observers:	D.J. Lawrence F.D. Ewing A.E. Swyers T.M. Hallett

ATLANTIC OCEANOGRAPHIC LABORATORY  
and  
MARINE ECOLOGY LABORATORY  
Bedford Institute, Dartmouth, N.S.





## SECTION I

Description of data collection procedures











## INTRODUCTION

The purpose of the cruise was to service the permanent Sambro current meter-thermograph mooring and to install three other moorings on the "Halifax Line".

## EXTRACT OF CRUISE LOG

Depart	Dartmouth, N.S.	-	3 June 1968
Return	Dartmouth, N.S.	-	6 June 1968

## OBSERVATIONAL AND LABORATORY PROCEDURES

Four oceanographic stations were occupied employing Knudsen water bottles and Richter & Wiese reversing thermometers. Observations were made at or near standard depths.

Surface water samples for surface temperature and salinity were obtained in a metal bucket. The temperature was measured with a mercury-in-glass thermometer graduated in 0.1°C intervals.

Weather observations were made at each station by ship's officers and scientific personnel.

Salinities were analyzed on the Auto-Lab salinometer.

## PERSONNEL

### At sea:

T.R. Foote	Officer-in-Charge
D.J. Lawrence	
J.L. Warner	
F.D. Ewing	
A. Swyers	
T.M. Hallett	

### Data Analyses

Compilation of data:	T.R. Foote
Salinity determinations:	E.F. MacDonald





## SECTION II

Description of the machine-generated data record



## INTRODUCTION

This section applies to the machine processing phase of the data reduction and computation.

The oceanographic data previously recorded on CODC data summary forms, a sample of which is shown on the next page, are transferred to punch-cards for subsequent electronic data processing on an IBM 1620 computer, using CODC's OCEANS II program. In addition to computing routine derived quantities, the program carries out unit and format conversions, range checks, plausibility tests, internal editing, and if required, interpolation at standard oceanographic depths. When interpolations are carried out, additional derived values are computed.

After the data have been processed, the data record is prepared using an IBM 1401 computer configuration with the OCEAN REPORT III program, which provides for pre-edited high speed print-out on continuous direct-image masters. These masters subsequently yield the required volume of copies for distribution.

Provision has been made to enter an "**estimate of precision**" for each observed variable selected for interpolation at standard oceanographic depths. The precision depends on the instrument and/or technique used to determine the variable. A standard precision stated as a **standard deviation** ( $\sigma$ ) can be determined for each instrument or technique under routine field conditions by making duplicate determinations of the variables for a homogeneous sample of sea water. These standard deviations are given for each cruise under "GENERAL INFORMATION" in section III of the data record.

The **measurement error estimate** of a specific observation in this data record, is stated as a multiple of the standard deviation derived as above, and entered in a column immediately to the right of the reported variable. In order to distinguish it from an additional decimal digit, the measurement error estimate is recorded alphabetically, (i.e.,  $1\sigma = A$ ,  $2\sigma = B$ , etc.; in this data record "A" is suppressed).

An option is provided with respect to the measurement of the salinity variable. If observed to three decimal digits, the last digit takes the place of the measurement error estimate.

In the past, a number of methods for both manual and machine interpolation have been developed. Studies and comparisons of the several methods have shown that no single method is universally acceptable. The manual methods are the most elaborate and flexible, but often require subjective decisions. In machine interpolation, all the present methods fail to yield acceptable results under some circumstances. Hence, it is considered necessary to qualify interpolated values by stating an "**interpolation error estimate**" derived from the particular interpolation formula used. There are two purposes in stating the error estimates; **first**, to give an indication of the quality of the interpolated data; **second**, to allow the oceanographer to redesign his observational procedures in order to reduce interpolation errors in future observations.

The interpolation scheme chosen for the OCEANS II program consists of a combination of two 3-point interpolations using the Lagrangian interpolation polynomial, as recommended by Rattray (1962). A parabola is fitted through three values of a given variable (T, S, O<sub>2</sub>) considered as a function of depth. The two interpolation parabolas require a total of four points (observed depths). The middle points are common to both parabolas. The average of the two values obtained from the parabolas at standard depth is taken as the interpolated value, and a function of their difference as an estimate of the interpolation error.

This function combined with the "**measurement error estimate**" comprises the "**combined measurement and interpolation error estimate**". It is expressed as a multiple of the standard deviation of measurement ( $\sigma$ ) under normal routine field conditions by:



## CANADIAN OCEANOGRAPHIC DATA CENTRE

1		2		3		5		6		7		9		VESEL	
IDENT. CODE		LATITUDE (N=+)		LONGITUDE (W=+)		DATE		TIME		DEPTH		NO. DEPTHS OBS'D.		ENTERED BY	
COUNTRY INST.		DEG. MIN.		DEG. MIN.		YEAR MONTH DAY		HOURS G.M.T.		TO BOTTOM				CHECKED BY	
1	8														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10	WATER	11	WAVES I	12	WAVES II	13	WIND	14	BAROMETER	15	AIR TEMP.	16	WET BULB	17	W.W. CODE
COLOUR. TRANS.	DW DP PW HW	DW DP PW HW	DW DP PW HW	DIR.	1000	10	10	10	10	10	10	10	10	10	10
36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115
116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131
132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163
164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195
196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211
212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227
228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259
260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275
276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291
292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307
308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339
340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355
356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371
372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387
388	389														

$$\frac{\sigma_i}{\sigma} = \left\{ \frac{(\Delta V_i)^2}{\sigma^2} + \sum_{n=j-2}^{j+1} (\gamma_n)^2 \left( \frac{\sigma_n}{\sigma} \right)^2 \right\}^{1/2}, \text{ where}$$

$\sigma$  = Standard deviation of the combined error estimates at standard oceanographic depth,  
 $\Delta V_i$  = the interpolation error estimate of variable "V" at standard oceanographic depth =  $^{1/3} (\bar{V}_{i_1} - V_{i_2})$   
 $\gamma$  = Interpolation polynomial coefficient.

$Z_j$  = Observed depth.

$Z_i$  = Standard oceanographic depth, such that:  $Z_{j-2} < Z_{j-1} < Z_i < Z_j < Z_{j+1}$

The integral part of the fraction  $\frac{\sigma_i}{\sigma}$ , if  $\geq 2$ , is reported in this Data Record following the interpolated variable. It represents the **combined measurement and interpolation error estimate**. In order to distinguish it from an additional decimal digit, it is recorded alphabetically (e.g.: 2 as "B", 3 as "C", etc.).

With respect to the interpolated value of the salinity variable if reported to three decimal digits, the **interpolation error estimate** is given only when  $\frac{\sigma_i}{\sigma} \geq 2$  (the salinity is then recorded to two decimal places). If less than 2, the mean obtained from the two interpolation parabolas is reported to three decimal places.

## EXPLANATION OF DATA RECORD HEADINGS

## MASTER HEADINGS

(1) C-REF-NO	(6) YR	(11) DEPTH	(16) WAVES 1	(21) AIR T	(26) VIS
(2) CONS. NO	(7) MONTH	(12) MXSAMPD	(17) WAVES 2	(22) WET B	(27) STN
(3) LAT	(8) DAY	(13) NO. DPTH	(18) WND-DIR	(23) ww-CODE	
(4) LON	(9) HR	(14) W-COLOR	(19) WND-FCE	(24) CLD-TPE	
(5) MARSD SQ	(10) C/I	(15) W-TRNSP	(20) BARO	(25) CLD-AMT	(28) HW

- (1) CRUISE REFERENCE NUMBER: Assigned by the Institute. Commences with 001 at the beginning of each year (effective Jan. 1, 1963). Prior to that date the CRN was a number designated by CODC.
- (2) CONSECUTIVE NUMBER: Indicates the chronological order in which the stations were occupied.
- (3) LATITUDE: Indicate the position of the platform at the time of observation.
- (4) LONGITUDE:
- (5) MARSDEN SQUARE: Designates the geographic area code of the observation (see Marsden square chart).
- (6) YEAR:
- (7) MONTH:
- (8) DAY:
- (9) HOUR: The time (Greenwich Mean Time) at which the surface environmental data were recorded. It is reported to tenths of hours (Table 1).  
If an "X" precedes the value for HOUR, (prior to Jan. 1, 1963) it indicates that the reported time is doubtful.
- (10) COUNTRY/INSTITUTE: The International Geophysical Year (IGY) Country Code/Institute Code - see Table 11.
- (11) DEPTH: The sounding reported in metres. If corrected, this is stated in the "GENERAL INFORMATION" chapter of section III. Charted depths are preceded by the letter "C".
- (12) MAXIMUM SAMPLING DEPTH: A code to indicate the deepest sampling depth (used for high speed sorting).
- 00 m - 50 m = 00  
51 m - 150 m = 01  
151 m - 250 m = 02  
etc.



- (13) NUMBER OF DEPTHS: The number of levels observed (this is entered to initiate a computer safety check, guarding against the loss of punch-cards).
- (14) WATER COLOUR: A code based on the percentage of yellow (see table 2 and Note under FIELD "15" below).
- (15) WATER TRANSPARENCY: The depth in metres at which a Secchi disc (white disc, 30 cm. in diameter) just disappears from view, or the optical density expressed in percentage;
- NOTE: The "GENERAL INFORMATION" chapter in section III of the data record will state which method was used.
- (16) WAVES 1  
( $d_W d_W P_W H_W$ -code): The direction, period and height of the **wind-propagated** wave system. (See Tables 3, 4 and 5). Ref: World Meteorological Organization Codes 0885, 3155, 1555.
- (17) WAVES 2  
( $d_W d_W P_W H_W$ -code): The direction, period and height of the predominant **non-wind-propagated** wave system. (See Tables 3, 4 and 5). Ref: World Meteorological Organization Codes 0885, 3155, 1555.
- (18) WIND DIRECTION: The true direction to the nearest 10 degrees from which the wind is blowing (wind direction 990 means:—wind variable or direction unknown).
- (19) WIND FORCE  
(WND-FCE): Beaufort notation (See Table 6).
- WIND SPEED  
(WND-SPD): Anemometer reading reported in metres per second. Instrument height reported in "GENERAL INFORMATION" chapter of section III.
- (20) BAROMETER: The barometric pressure reported in millibars: the "GENERAL INFORMATION" chapter in Section III of the data record will state the type of instrument used.
- (21) AIR TEMPERATURE: In degrees Celsius.
- (22) WET BULB: In degrees Celsius.
- (23) ww CODE: Present Weather Code (See Table 7). Ref: WMO Code 4677
- (24) CLOUD TYPE: The type of predominating clouds (See Table 8). Ref: WMO Code 0500.
- (25) CLOUD AMOUNT: The sky coverage in eighths (See Table 9) Ref: WMO Code 2700
- (26) VISIBILITY: Visibility at the surface (See Table 10). Ref: WMO Code 4300.
- (27) STATION: A station reference number, assigned by the institute prior to, or during the survey.
- (28) HOURS AFTER HIGH WATER: Indicates the state of the tide for nearshore observations.

## OBSERVED DATA HEADINGS

(1) GMT	(2) DEPTH	(3) TEMP	(4) SAL	(5) OXYGEN	(6) SGMT
(7) SOUND	(8) $PO_4$	(9) -P-	(10) $NO_2$	(11) $NO_3$	(12) $SiO_2$
				(13) pH.	

NOTE: Headings (1) to (7) will always be present. Headings (8) to (13) appear only when one or more additional chemical entries were made.

(1) G.M.T.: The Greenwich Mean Time of (in-situ) thermometer inversion and sea water sample collection.

When a multiple cast was initiated prior to and continued after midnight, the times indicated are uninterrupted by the change of day and appear beyond 24.0 hours. This will be accompanied by a statement: "MULTIPLE CAST CONTINUED NEXT DAY", which is printed following the last level of observed values.

(2) DEPTH: The depth in metres at the reversal time of deepest cast.

(3) TEMPERATURE: Temperatures from deepsea reversing thermometers, read to 0.01° C. Surface temperature measurement procedures are described in the chapter "OBSERVATION PROCEDURES" of section I, and/or the "GENERAL INFORMATION" chapter of section III. An alphabetical character following the temperature value represents the measurement error estimate referred to in the INTRODUCTION to this section.

(4) SALINITY: Salinity as defined by:  $S = 0.03 + 1.805 C1\%$ , reported in:  
 a. 1/100 parts per 1000, or  
 b. 1/1000 parts per 1000.

In case a: an alphabetical character following the value is the measurement error estimate as referred to under (3).

In case b: no error estimate indication is provided for, but an additional decimal digit takes its place.

(5) OXYGEN: The concentration of dissolved oxygen expressed in millilitres per litre to 2 decimal places. An alphabetical character following the value is the measurement error estimate as referred to under (3).

(6) SIGMA-T: The specific gravity anomaly as defined by:  $(\text{Specific gravity} - 1) \times 10^3$  (e.g.,  $\sigma_t$  reported as 2456, reads 24.56, and corresponds to a specific gravity of 1.02456).

(7) SOUND: The sound velocity is reported in m/sec. to 1 decimal place (e.g., 1437.9 m/sec.). The computation is carried out using Wilson's formula (1960), expressed in terms of temperature, salinity and total pressure.

- (8) PO<sub>4</sub>                      Phosphate-Phosphorus reported to hundredths of microgram-atoms per litre.
- (9) -P-                      Total Phosphorus reported to hundredths of microgram-atoms per litre.
- (10) NO<sub>2</sub>                    Nitrite-Nitrogen reported to hundredths of microgram-atoms per litre — No dissolved nitrogen included —
- (11) NO<sub>3</sub>                    Nitrate-Nitrogen reported to tenths of microgram-atoms per litre.
- (12) SiO<sub>2</sub>                    Silicate-Silicon reported in whole microgram-atoms per litre.
- (13) pH                      The pH value.

NOTE: "TRC" (trace) is reported when a chemical entry has a value less than the standard deviation of measurement for that particular variable.

#### INTERPOLATED DATA HEADINGS

(1) DEPTH	(2) TEMP	(3) SAL	(4) OXYGEN	(5) SGMT	(6) SOUND
(7) DELTA-D	(8) POT-EN	(9) SVA.			

- (1) DEPTH:                      Standard Oceanographic Depth in whole metres, as well as additional depths: 125, 175, 225, 3500, 4500, 5500, 6500, 7500, 8500, 9500.
- (2) TEMPERATURE:            Interpolated value at standard depth, followed by the combined measurement and interpolation error estimate (see "INTRODUCTION" to section II of the data record).
- (3) SALINITY:                    A. The reported salinity values are measured to three decimal places.  
     (i) the interpolation error estimate is less than twice the standard deviation of measurement  
     —the interpolated value is reported to three decimal places (e.g., 30.139).  
     (ii) the interpolation error estimate is equal to or greater than twice the standard deviation of measurement.  
     —the interpolated value is reported to two decimal places, and followed by the interpolation error estimate (e.g., 29.23 C).  
     B. The reported salinity values are measured to two decimal places and followed by the measurement error estimate.  
     —the interpolated value is reported to two decimal places, and followed by the combined measurement and interpolation error estimate (e.g., 30.59 B).
- (4) OXYGEN:                      Interpolated value at standard depth, followed by the combined measurement and interpolation error estimate (see "Introduction" to section II of the data record).

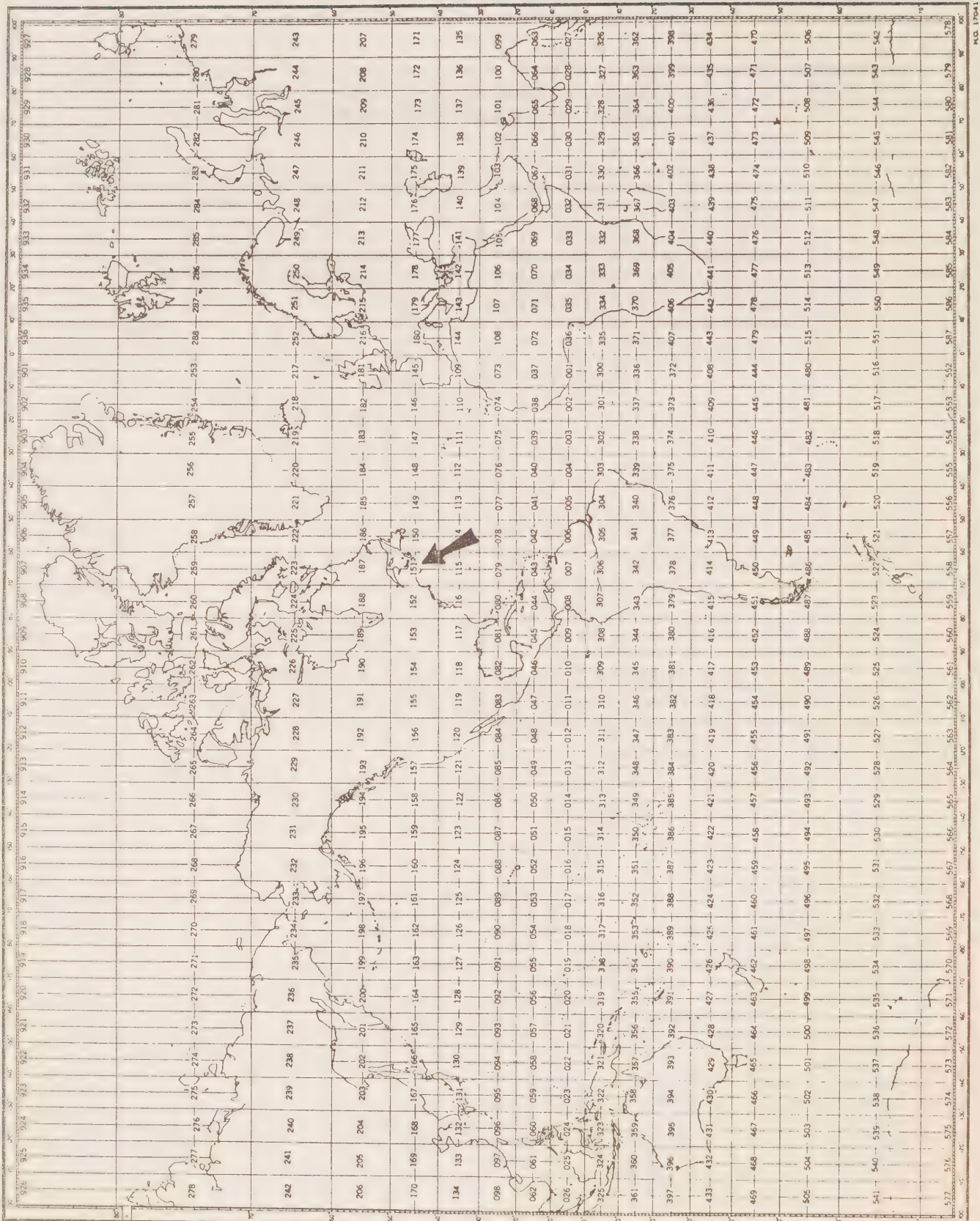


- (5) SIGMA-T: Computed from temperature and salinity values at standard oceanographic depth.
- (6) SOUND VELOCITY: Computed from temperature, salinity and total pressure values at standard oceanographic depth, using Wilson's formula (1960).
- (7) DELTA-D: The geo-potential anomaly as defined by:
- $$\Delta D = \int_0^P \delta dp$$
- $\Delta D$  is expressed in dynamic metres ( $10^5$  ergs/gram) and recorded to three decimal places (e.g., 2.345 dyn. metres).
- (8) POTENTIAL ENERGY ANOMALY: The Potential energy anomaly  $\chi$  as defined by:
- $$\chi = \frac{1}{g} \int_0^P p \delta dp = \int_0^Z \rho p \delta dz$$
- $\chi$  is expressed in units of  $10^6$  ergs/cm<sup>2</sup> and recorded to two decimal places (e.g., 116.44).
- (9) SPECIFIC VOLUME ANOMALY: The specific volume anomaly as defined by:
- $$\delta = \alpha - \alpha_{35.0.P}$$
- $\delta$  is expressed in ml/gr, and conventionally reported as  $10^5 \delta$ , to one decimal place (i.e.,  $\delta$  reported as 1234, reads 123.4, and corresponds to a specific volume anomaly of 0.001234 ml/gr.).

## SPECIAL CHARACTERS

‡ (Record mark): is used to indicate inconsistencies which are printed in an area below the "Observed Data". A corresponding record mark at the extreme left hand side indicates the level at which the inconsistency occurs

\* (Asterisk): this character may occur in the **interpolated** portion of the data record. It is printed at the extreme left hand side of the page, when three or more standard depth levels fall within any one **observed depth interval**. The **third**, and all consequent levels are preceded by the asterisk to indicate that more than **two** machine interpolations were carried out, utilizing the same set of interpolation parabolas. The asterisk will also appear when the last standard depth is an extrapolation and there are at least two interpolations between the last two observed depths.



MARSDEN SQUARE CHART



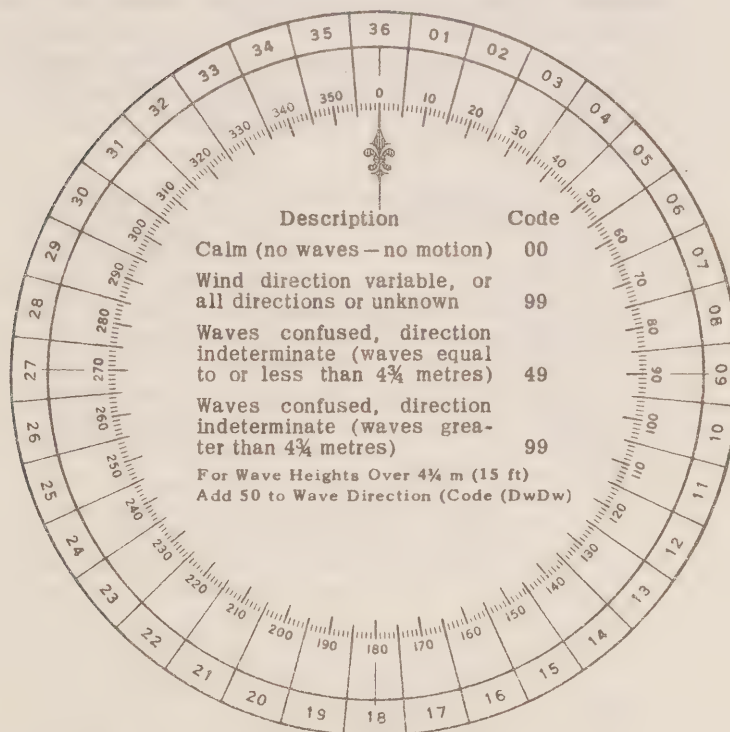
**Table 1**  
**CONVERSION**  
**MINUTES TO  $\frac{1}{10}$  HRS.**

Minutes	Tenths Hrs.
00-03	0
04-08	1
09-15	2
16-20	3
21-27	4
28-32	5
33-39	6
40-44	7
45-51	8
52-56	9
57-59	0 (next HR.)

**Table 2**  
**WATER COLOR CODE**  
**Based on Percentage Yellow**

Code:	Description
00	Deep Blue
10	Blue
20	Greenish Blue
30	Bluish Green
40	Green
50	Light Green
60	Yellowish Green
70	Yellow Green
80	Green Yellow
90	Greenish Yellow
99	Yellow

**Table 3. DIRECTION CODE (dd)**



**NOTE:**

Always use the true direction from which the wind is blowing, or the direction from which Waves I (sea), or Waves II (swell) come.

**Table 4. PERIOD OF THE WAVES ( $P_w$ )**  
(Measure to the Nearest Second)

Code:	Period in Seconds:	Code:	Period in Seconds:
2	5 sec. or less	8	16 or 17 sec.
3	6 or 7 sec.	9	18 or 19 sec.
4	8 or 9 sec.	0	20 or 21 sec.
5	10 or 11 sec.	1	Over 21 sec.
6	12 or 13 sec.	X	Calm, or period not determined
7	14 or 15 sec.		

**Table 5. HEIGHT OF THE WAVES ( $H_w$ )**

- The average value of the wave height (vertical distance between trough and crest) is reported, as obtained from the larger well formed waves of the wave system being observed.
- Each code figure provides for reporting a range of heights. For example: 1 =  $\frac{1}{4}$  m (1 ft) to  $\frac{3}{4}$  m (2½ ft); 5 =  $2\frac{1}{4}$  m (7 ft) to  $2\frac{3}{4}$  m (9 ft); 9 =  $4\frac{1}{4}$  m (13½ ft) to  $4\frac{3}{4}$  m (15 ft), etc.
- If a wave height comes exactly midway between the heights corresponding to two code figures, the lower code figure is reported; e.g. a height of  $2\frac{3}{4}$  m is reported by code figure 5.

Code			Code
0	Less than ¼ m (1 ft)	Add 50 to Dw Dw	0 5 m (16 ft)
1	½ m ( 1½ ft)		1 5½ m (17½ ft)
2	1 m ( 3 ft)		2 6 m (19 ft)
3	1½ m ( 5 ft)		3 6½ m (21 ft)
4	2 m ( 6½ ft)		4 7 m (22½ ft)
5	2½ m ( 8 ft)		5 7½ m (24 ft)
6	3 m ( 9½ ft)		6 8 m (25½ ft)
7	3½ m (11 ft)		7 8½ m (27 ft)
8	4 m (13 ft)		8 9 m (29 ft)
9	4½ m (14 ft)		9 9½ m (30½ ft) or more
x	Height not determined		

Add  
50  
to  
Dw Dw

Table 6. WIND FORCE CODE

The Beaufort force of the wind is estimated from the appearance of the sea surface, according to the table below. This table is only intended as a guide to show roughly what may be expected on the open sea, remote from land. Factors which must be taken into account are the "lag" effect between the wind increasing and the sea getting up; and the influence of "fetch", depth, swell, heavy rain and tide effect on the appearance of the sea. Estimation of the wind force by this method becomes unreliable in shallow water or when close inshore, owing to the tidal effect and the shelter provided by the land.

Code	Appearance of sea if fetch and duration of the blow have been sufficient to develop the sea fully	Description
00	Sea like a mirror	Calm
01	Ripples with the appearance of scales are formed, but without foam crests.	Light Air
02	Small wavelets; crests have a glassy appearance and do not break.	Light Breeze
03	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses.	Gentle Breeze
04	Small waves, becoming longer; fairly frequent white horses.	Moderate breeze
05	Moderate waves; many white horses are formed (chance of some spray)	Fresh Breeze
06	Large waves; white foam crests everywhere (probably some spray)	Strong Breeze
07	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	Near Gale
08	Moderately high waves; edges of crests begin to break into the spindrift; foam is blown in well-marked streaks along the direction of the wind.	Gale
09	High waves; dense streaks of foam along wind; crests begin to topple, tumble and roll over; spray may affect visibility.	Strong Gale
10	Very high waves with long overhanging crests; foam in great patches blown in dense white streaks along wind; sea surface takes a white appearance; tumbling becomes heavy and shock-like; visibility affected.	Storm
11	Exceptionally high waves (medium sized ships may be lost to view behind waves); sea covered with long white patches of foam lying along the wind; everywhere edges of crests are blown into froth; visibility affected.	Violent Storm
12	Air is filled with foam and spray; sea completely white with driving spray; visibility seriously affected.	Hurricane

Table 7. PRESENT WEATHER

W.W. CODE

## NO PRECIPITATION ON STATION AT TIME OF OBSERVATION

Code figure		ww
No meteors except photometeors	00	Cloud development not observed or not observable
	01	Clouds generally dissolving or becoming less developed
	02	State of sky on the whole unchanged
	03	Clouds generally forming or developing
Haze, dust, sand or smoke	04	Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes
	05	Haze
	06	Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation
	07	Dust or sand raised by wind at or near the station at the time of observation, but no well developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen
	08	Well developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the time of observation, but no dustorm or sandstorm
	09	Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour
	10	Mist
	11	{ Patches of } shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 metres on land or 10 metres at sea
	12	
	13	Lightning visible, no thunder heard
	14	Precipitation within sight, not reaching the ground or the surface of the sea
	15	Precipitation within sight, reaching the ground or the surface of the sea, but distant (i.e. estimated to be more than 5 km) from the station
	16	Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station
	17	Thunderstorm, but no precepitation at the time of observation
	18	Squalls
19	Funnel clouds	

ww = 20 - 29	20	Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation	{ not falling as shower(s)
	20	Drizzle (not freezing) or snow grains	
	21	Rain (not freezing)	
	22	Snow	
	23	Rain and snow or ice pellets, type (a)	
	24	Freezing drizzle or freezing rain	
	25	Shower(s) of rain	
	26	Shower(s) of snow, or of rain and snow	
	27	Shower(s) of hail, or of rain and hail	
	28	Fog or ice fog	
	29	Thunderstorm (with or without precipitation)	
ww = 30 - 39		Duststorm, sandstorm, drifting or blowing snow	
	30	{ Slight or moderate dust-storm or sand-storm }	-has decreased during the preceding hour
	31		-no appreciable change during the preceding hour
	32		-has begun or has increased during the preceding hour
	33	{ Severe dust-storm or sand-storm }	-has decreased during the preceding hour
	34		-no appreciable change during the preceding hour
	35		-has begun or has increased during the preceding hour
	36	Slight or moderate blowing snow	{ generally low (below eye level)
	37	Heavy drifting snow	
	38	Slight or moderate blowing snow	{ generally high (above eye level)
	39	Heavy blowing snow	
ww = 40 - 49		Fog or ice fog at the time of observation	
	40	Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer	
	41	Fog or ice fog in patches	
	42	Fog or ice fog, sky visible	{ has become thinner during the preceding hour
	43	Fog or ice fog, sky invisible	
	44	Fog or ice fog, sky visible	{ no appreciable change during the preceding hour
	45	Fog or ice fog, sky invisible	
	46	Fog or ice fog, sky visible	{ has begun or has become thicker during the preceding hour
	47	Fog or ice fog, sky invisible	
	48	Fog, depositing rime, sky visible	
	49	Fog, depositing rime, sky invisible	

## NO PRECIPITATION ON STATION AT TIME OF OBSERVATION



## PRECIPITATION ON STATION AT TIME OF OBSERVATION

## ww = 50 - 59 Drizzle

- |    |  |  |
|----|--|--|
| 50 | Drizzle, not freezing, intermittent          | } slight at time of observation        |
| 51 | Drizzle, not freezing, continuous            |  |
| 52 | Drizzle, not freezing, intermittent          | } moderate at time of observation      |
| 53 | Drizzle, not freezing, continuous            |  |
| 54 | Drizzle, not freezing, intermittent          | } heavy (dense) at time of observation |
| 55 | Drizzle, not freezing, continuous            |  |
| 56 | Drizzle, freezing, slight                    |  |
| 57 | Drizzle, freezing, moderate or heavy (dense) |  |
| 58 | Drizzle and rain, slight                     |  |
| 59 | Drizzle and rain, moderate or heavy          |  |

## ww = 60 - 69 Rain

- |    |   |                                   |
|----|---|-----------------------------------|
| 60 | Rain, not freezing, intermittent            | } slight at time of observation   |
| 61 | Rain, not freezing, continuous              |                                   |
| 62 | Rain, not freezing, intermittent            | } moderate at time of observation |
| 63 | Rain, not freezing, continuous              |                                   |
| 64 | Rain, not freezing, intermittent            | } heavy at time of observation    |
| 65 | Rain, not freezing, continuous              |                                   |
| 66 | Rain, freezing, slight                      |                                   |
| 67 | Rain, freezing, moderate or heavy           |                                   |
| 68 | Rain or drizzle and snow, slight            |                                   |
| 69 | Rain or drizzle and snow, moderate or heavy |                                   |

## 70 - 79 Solid precipitation not in showers

- |    |   |                                   |
|----|---|-----------------------------------|
| ww |   |                                   |
| 70 | Intermittent fall of snow flakes                      | } slight at time of observation   |
| 71 | Continuous fall of snow flakes                        |                                   |
| 72 | Intermittent fall of snow flakes                      | } moderate at time of observation |
| 73 | Continuous fall of snow flakes                        |                                   |
| 74 | Intermittent fall of snow flakes                      | } heavy at time of observation    |
| 75 | Continuous fall of snow flakes                        |                                   |
| 76 | Ice prisms (with or without fog)                      |                                   |
| 77 | Snow grains (with or without fog)                     |                                   |
| 78 | Isolated starlike snow crystals (with or without fog) |                                   |
| 79 | Ice pellets, type (a)                                 |                                   |

## ww = 80 - 99 Showery precipitation, or precipitation with current or recent thunderstorm

- |    |  |   |
|----|--|---|
| 80 | Rain shower(s), slight   |   |
| 81 | Rain shower(s), moderate or heavy  |   |
| 82 | Rain shower(s), violent  |   |
| 83 | Shower(s) of rain and snow mixed, slight   |   |
| 84 | Shower(s) of rain and snow mixed, moderate or heavy  |   |
| 85 | Snow shower(s), slight   |   |
| 86 | Snow shower(s), moderate or heavy  |   |
| 87 | Shower(s) of snow pellets or ice pellets, type (b), with or without rain                         | } - slight  |
| 88 | or rain and snow mixed   |   |
| 89 | Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder      | } - moderate or heavy   |
| 90 |  |   |
| 91 | Slight rain at time of observation   | } thunderstorm during the preceding hour but not at time of observation |
| 92 | Moderate or heavy rain at time of observation  |   |
| 93 | Slight snow, or rain and snow mixed or hail at time of observation                               |   |
| 94 | Moderate or heavy snow, or rain and snow mixed or hail at time of observation                    | } thunderstorm at time of observation                                   |
| 95 | Thunderstorm, slight or moderate, without hail, but with rain and/or snow at time of observation |   |
| 96 | Thunderstorm, slight or moderate, with hail at time of observation                               |   |
| 97 | Thunderstorm, heavy, without hail, but with rain and/or snow at time of observation              |   |
| 98 | Thunderstorm, combined with duststorm or sandstorm at time of observation                        |   |
| 99 | Thunderstorm, heavy, with hail at time of observation  |   |

## PRECIPITATION ON STATION AT TIME OF OBSERVATION

Table 8. CLOUD TYPE CODE

Code	Cloud Type	Code	Cloud Type
0	Cirrus ..... Ci	5	Nimbostratus ..... Ns
1	Cirrocumulus ..... Cc	6	Stratocumulus ..... Sc
2	Cirrostratus ..... Cs	7	Stratus ..... St
3	Alto cumulus ..... Ac	8	Cumulus ..... Cu
4	Altostratus ..... As	9	Cumulonimbus ..... Cb
X	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other analogous phenomena		

Table 9. CLOUD AMOUNT CODE

Code	Cloud Cover	Code	Cloud Cover
0	0	6	6 oktas
1	1 okta or less, but not zero	7	7 oktas or more, but not 8 oktas
2	2 oktas	8	8 oktas
3	3 oktas	9	Sky obscured, or cloud amount cannot be estimated
4	4 oktas		
5	5 oktas		

Note: 1 okta =  $\frac{1}{8}$  of the sky covered

Table 10. VISIBILITY

Code	Estimate of hor. Visibility
0	Less than 50 metres (less than 55 yards)
1	50-200 metres (approx. 55-220 yards)
2	200-500 metres (approx. 220-550 yards)
3	500-1,000 metres (approx. 550 yards- $\frac{5}{8}$ n.m.)
4	1-2 km (approx. $\frac{5}{8}$ -1 n.m.)
5	2-4 km (approx. 1-2 n.m.)
6	4-10 km (approx. 2-6 n.m.)
7	10-20 km (approx. 6-12 n.m.)
8	20-50 km (approx. 12-30 n.m.)
9	50 km or more (30 n.m. or more)

Note: n.m. = nautical mile

TABLE 11. INSTITUTE CODE

Code	Institute
01	Marine Ecology Laboratory, Bedford Institute
02	Pacific Oceanographic Group
03	Biological Station, St. Andrews, N.B.
04	Arctic Biological Station, Ste. Anne de Bellevue, P.Q.
05	Biological Station, St. John's Nfld.
06	Station de Biologie Marine, Grande Riviere, P.Q.
07	Marine Sciences Branch, Central Region
08	Defence Research Establishment, Atlantic
09	Defence Research Establishment, Pacific
10	Atlantic Oceanographic Laboratory, Bedford Institute
11	Polar Continental Shelf Project
12	Great Lakes Institute
13	Institute of Oceanography, University of British Columbia
14	Institute of Oceanography, Dalhousie University
15	Marine Sciences Branch, Pacific Region
16	Department of Transport
17	Marine Sciences Centre, McGill University
18	Canadian Forces Maritime Command, East Coast
19	Canadian Forces Maritime Command, West Coast
20	Ontario Water Resources Commission
21	Dept. of National Health and Welfare
22	Inland Waters Branch, Dept. of Energy, Mines and Resources.





### SECTION III

Serial oceanographic data



GENERAL INFORMATION

<u>Institute:</u>	Atlantic Oceanographic Laboratory Bedford Institute
<u>Observation platform:</u>	CSS "Dawson"
<u>Vessel's cruising speed:</u>	14 knots
<u>Total number of stations occupied:</u>	4
<u>Anemometer height above sea level:</u>	19 metres
<u>Barometer readings:</u>	Aneroid Barometer (corrected)
<u>Air temperature:</u>	Sling Psychrometer
<u>Wet bulb temperature:</u>	Sling Psychrometer
<u>Surface sea water temperature:</u>	Bucket sample (deck thermometer)

The following Standard Deviations were used to express both measurement and interpolation error estimates:

Temperature	0.02
Salinity	0.003





C-REF-NO 017	YR 1968	DEPTH 106	WAVES 1 1512	AIR T 10.2	VIS 7
CONS. NO 001	MONTH 6	MXSAMPD 01	WAVES 2 1552	WET B 09.5	STN
LAT 44-245N	DAY 04	NO.DPTH 7	WND-DIR 300	WW-CODE 44	
LON 63-304W	HR 13.8	W-COLOR	WND-FCE 01	CLD-TPE 2	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1007.8	CLD-AMT 1	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
138	0000	073 B				
138	0010	0712	31342		2455	14749
138	0020	0427	31465		2498	14636
138	0030	0319	31716		2527	14595
138	0050	0206	31937		2554	14552
138	0075	0150	32457		2599	14538
138	0100	0155	32525		2605	14545

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	0730 B	3117 I		2439	14752	0000	00000	3550
0010	0712	31342		2455	14749	0035	00002	3397
0020	0427	31465		2498	14636	0067	00007	2991
0030	0319	31716		2527	14595	0096	00014	2706
0050	0206	31937		2554	14552	0148	00035	2453
0075	0150	32457		2599	14538	0204	00070	2021
0100	0155	32525		2605	14545	0254	00115	1973

C-REF-NO 017	YR 1968	DEPTH 45	WAVES 1 1512	AIR T 10.2	VIS 7
CONS. NO 002	MONTH 6	MXSAMPD 00	WAVES 2 1552	WET B 09.5	STN
LAT 44-265N	DAY 04	NO.DPTH 5	WND-DIR 300	WW-CODE 44	
LON 63-561W	HR 15.9	W-COLOR	WND-FCE 01	CLD-TPE 2	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1007.5	CLD-AMT 1	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
159	0000	083 B	31225		2429	14792
159	0010	0797	31247		2436	14781
159	0020	0494	31392		2485	14663
159	0030	0292	31545		2516	14581
159	0040	0223	31728		2536	14555

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	0830 B	31225		2429	14792	0000	00000	3639
0010	0797	31247		2436	14781	0036	00002	3579
0020	0494	31392		2485	14663	0070	00007	3112
0030	0292	31545		2516	14581	0100	00014	2814

C-REF-NO 017	YR 1968	DEPTH	87	WAVES 1 1512	AIR T 10.3	VIS 7
CONS. NO 003	MONTH 6	MXSAMPD	01	WAVES 2 1552	WET B 09.7	STN
LAT 44-155N	DAY 04	NO.DPTH	6	WND-DIR 300	WW-CODE 44	
LON 63-491W	HR 17.3	W-COLOR		WND-FCE 02	CLD-TPE 2	
MARSD SQ 151	C/I 1810	W-TRNSP		BARO 1007.0	CLD-AMT 2	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
173	0000	082 B	31134		2424	14787
173	0010	0777	31116		2428	14771
173	0020	0426	31302		2485	14633
173	0030	0222	31418		2511	14548
173	0050	0233	31898		2549	14563
173	0075	0231	32158		2570	14570

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	0820 B	31134		2424	14787	0000	00000	3693
0010	0777	31116		2428	14771	0037	00002	3650
0020	0426	31302		2485	14633	0071	00007	3113
0030	0222	31418		2511	14548	0101	00015	2858
0050	0233	31898		2549	14563	0155	00036	2502
0075	0231	32158		2570	14570	0215	00075	2304

C-REF-NO 017	YR 1968	DEPTH 268	WAVES 1 1512	AIR T 11.0	VIS 7
CONS. NO 004	MONTH 6	MXSAMPD 02	WAVES 2 1552	WET B 10.0	STN
LAT 43-456N	DAY 04	NO.DPTH 10	WND-DIR 300	WW-CODE 01	
LON 63-005W	HR 22.6	W-COLOR	WND-FCE 02	CLD-TPE 2	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1007.2	CLD-AMT 2	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
226	0000	082 B	31554		2457	14792
226	0010	0771	31570		2465	14775
226	0020	0695	31717		2487	14749
226	0030	0522	31960		2527	14684
226	0050	0395	32376		2573	14639
226	0075	0445	33293		2641	14677
226	0100	0681	34168		2681	14788
226	0150	0810	34709		2705	14854
226	0200	0799	34794		2713	14859
226	0250	0747	34831		2724	14848

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	0820 B	31554		2457	14792	0000	00000	3380
0010	0771	31570		2465	14775	0034	00002	3303
0020	0695	31717		2487	14749	0066	00007	3097
0030	0522	31960		2527	14684	0095	00014	2715
0050	0395	32376		2573	14639	0145	00034	2276
0075	0445	33293		2641	14677	0194	00065	1637
0100	0681	34168		2681	14788	0231	00097	1261
0125	0783 G	3457 I		2698	14838	0261	00131	1107
0150	0810	34709		2705	14854	0288	00169	1046
0175	0816 B	3478 F		2710	14861	0314	00212	1004
0200	0799	34794		2713	14859	0339	00260	0976
0225	0793 D	3488 I		2721	14862	0363	00312	0909
0250	0747	34831		2724	14848	0385	00367	0883



PART II

by

CSS "Dawson"

(CODC Reference 10-68-003)



DEPARTMENT OF ENERGY, MINES AND RESOURCES  
and  
FISHERIES RESEARCH BOARD OF CANADA

SCOTIAN SHELF (Part II)

Ship:	CSS "Dawson"
Local cruise designation:	BI 5768
CODC cruise reference no:	10-68-003
Cruise period:	October 16 - October 29, 1968
Officer-in-Charge:	T.R. Foote
Observers:	D.J. Lawrence F.D. Ewing T.M. Hallett G.B. Taylor

ATLANTIC OCEANOGRAPHIC LABORATORY  
and  
MARINE ECOLOGY LABORATORY  
Bedford Institute, Dartmouth, N.S.





## SECTION I

Description of data collection procedures









## INTRODUCTION

The purpose of the cruise was to recover and service the six permanent "Halifax Line" current meter-thermograph stations, to recover two moorings on the Slope and to run the "Halifax Line of oceanographic and bathythermograph stations.

## EXTRACT OF CRUISE LOG

Depart Dartmouth, N.S. - 16 October 1968

Return Dartmouth, N.S. 29 October 1968

## OBSERVATIONAL AND LABORATORY PROCEDURES

Temperature and salinity data were collected in single casts at seven stations on the "Halifax Line". Standard sampling procedures and depths were used. Two protected Richter and Weise thermometers were used on Knudsen-type sampling bottles.

Water samples were measured for salinity, at Bedford Institute, by the conductivity bridge method (Auto Lab Salinometer).

Weather observations were made at each oceanographic station by the ship's officers.

## PERSONNEL

### At sea:

T.R. Foote	Officer-in-Charge
D.J. Lawrence	
F.D. Ewing	
T.M. Hallett	
G.B. Taylor	
G.A. Fowler	
A.C. Stuart	

### Data Analyses

Compilation of data: T.R. Foote

Salinity determinations: E.F. MacDonald



## SECTION II

Description of the machine-generated data record

SEE SECTION II OF PART I



### SECTION III

Serial oceanographic data



GENERAL INFORMATION

<u>Institute:</u>	Atlantic Oceanographic Laboratory
<u>Observation platform:</u>	CSS "Dawson"
<u>Vessel's cruising speed:</u>	14 Knots
<u>Total number of stations occupied:</u>	14
<u>Anemometer height above sea level:</u>	18 metres
<u>Barometer readings:</u>	Aneroid Barometer (corrected)
<u>Air temperature:</u>	Sling Psychrometer
<u>Wet bulb temperature:</u>	Sling Psychrometer
<u>Surface sea water temperature:</u>	Bucket sample (deck thermometer)

The following Standard Deviations were used to express both measurement and interpolation error estimates.

Temperature:	0.02
Salinity:	0.003





C-REF-NO 003	YR 1968	DEPTH 2840	WAVES 1 1022	AIR T 12.8	VIS 9
CONS. NO 001	MONTH 10	MXSAMPD 10	WAVES 2 2744	WET B 11.6	STN
LAT 42-335N	DAY 20	NO.DPTH 13	WND-DIR 100	WW-CODE 50	
LON 61-240W	HR 11.6	W-COLOR	WND-SPD 06	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1015.5	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
116	0000	187 B	34957		2508	15185
116	0010	1867	34949		2508	15185
116	0020	1867	34944		2508	15187
116	0030	1867	34944		2508	15188
116	0050	1770	35506		2575	15170
116	0075	1683	35491		2595	15149
116	0100	1592	35493		2616	15125
116	0150	1498	35478		2636	15104
116	0200	1321	35453		2672	15054
116	0300	1178	35339		2691	15021
116	0500	0634	34948		2749	14846
116	0750	0480	34927		2766	14825
116	1000	0430	34930		2772	14846

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SWA
0000	1870 B	34957		2508	15185	0000	00000	2887
0010	1867	34949		2508	15185	0029	00001	2889
0020	1867	34944		2508	15187	0058	00006	2897
0030	1867	34944		2508	15188	0087	00013	2900
0050	1770	35506		2575	15170	0139	00034	2269
0075	1683	35491		2595	15149	0194	00069	2089
0100	1592	35493		2616	15125	0244	00114	1893
0125	1543 D	35488		2627	15114	0291	00167	1798
0150	1498	35478		2636	15104	0335	00229	1717
0175	1410 C	35467		2654	15080	0376	00298	1550
0200	1321	35453		2672	15054	0413	00369	1389
0225	1276 F	35431		2679	15043	0447	00443	1324
0250	1237 H	35405		2685	15034	0480	00523	1276
0300	1178	35339		2691	15021	0543	00701	1226
0400	0904 I	3514 H		2724	14936	0652	01083	0923
0500	0634	34948		2749	14846	0733	01451	0679
0600	0531 I	3491 G		2759	14821	0797	01810	0588
0700	0483 F	3491 D		2764	14818	0853	02189	0538
0800	0382 I	3484 I		2770	14791	0905	02583	0476
1000	0430	34930		2772	14846	1002	03488	0488

C-REF-NO 003	YR 1968	DEPTH 940	WAVES 1 1023	AIR T 13.5	VIS 9
CONS. NO 002	MONTH 10	MXSAMPD 07	WAVES 2 2744	WET B 12.8	STN
LAT 42-518N	DAY 20	NO.DPTH 12	WND-DIR 100	WW-CODE 60	
LON 61-450W	HR 14.9	W-COLOR	WND-SPD 11	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1012.5	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
149	0000	162 B	33180		2432	15089
149	0010	1622	33187		2433	15092
149	0020	1783	34112		2465	15153
149	0030	1867	34734		2492	15186
149	0050	1630	34670		2544	15119
149	0075	1389	35153		2635	15052
149	0100	1477	35727		2660	15092
149	0150	1224	35421		2689	15013
149	0200	1074	35256		2704	14967
149	0300	0861	35098		2728	14903
149	0500	0552	34913		2757	14813
149	0750	0444	34928		2770	14810

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1620 B	33180		2432	15089	0000	00000	3610
0010	1622	33187		2433	15092	0036	00002	3612
0020	1783	34112		2465	15153	0071	00007	3303
0030	1867	34734		2492	15186	0103	00015	3052
0050	1630	34670		2544	15119	0159	00038	2560
0075	1389	35153		2635	15052	0213	00071	1708
0100	1477	35727		2660	15092	0253	00107	1476
0125	1380 I	3569 I		2678	15064	0288	00147	1314
0150	1224	35421		2689	15013	0320	00192	1213
0175	1141 B	35326		2697	14987	0350	00241	1136
0200	1074	35256		2704	14967	0378	00294	1076
0225	1013 B	3520 B		2711	14948	0404	00352	1016
0250	0958 B	3516 C		2717	14932	0429	00413	0962
0300	0861	35098		2728	14903	0475	00542	0864
0400	0684	34984		2745	14850	0554	00823	0706
0500	0552	34913		2757	14813	0620	01124	0597
0600	0479 B	34886		2763	14799	0677	01447	0538
0700	0444	34903		2768	14801	0730	01795	0495

C-REF-NO 003	YR 1968	DEPTH	98	WAVES 1 1023	AIR T 14.3	VIS 9
CONS. NO 003	MONTH 10	MXSAMPD	01	WAVES 2 XX	WET B 14.2	STN
LAT 43-105N	DAY 20	NO.DPTH	6	WND-DIR 120	WW-CODE 60	
LON 62-055W	HR 17.3	W-COLOR		WND-SPD 12	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP		BARO 1008.0	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
173	0000	151 B	31823		2353	15038
173	0010	1504	31819		2354	15038
173	0020	1607	31899		2337	15073
173	0030	1648	33095		2420	15102
173	0050	1269	33430		2526	14987
173	0075	0665	33262		2612	14766

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1510 B	31823		2353	15038	0000	00000	4371
0010	1504	31819		2354	15038	0044	00002	4364
0020	1607	31899		2337	15073	0088	00009	4524
0030	1648	33095		2420	15102	0130	00020	3742
0050	1269	33430		2526	14987	0195	00045	2733
0075	0665	33262		2612	14766	0254	00081	1912

C-REF-NO 003	YR 1968	DEPTH 64	WAVES 1 1224	AIR T 14.1	VIS 9
CONS. NO 004	MONTH 10	MXSAMPD 00	WAVES 2 XX	WET B 14.0	STN
LAT 43-286N	DAY 20	NO.DPTH 5	WND-DIR 120	WW-CODE 63	
LON 62-263W	HR 19.4	W-COLOR	WND-SPD 13	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1006.0	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
194	0000	159 B	32516		2388	15072
194	0010	1580	32512		2390	15070
194	0020	1581	32516		2390	15072
194	0030	1610	32698		2398	15085
194	0050	0948	33407		2582	14873

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1590 B	32516		2388	15072	0000	00000	4031
0010	1580	32512		2390	15070	0040	00002	4015
0020	1581	32516		2390	15072	0081	00008	4017
0030	1610	32698		2398	15085	0121	00018	3949
0050	0948	33407		2582	14873	0183	00042	2200

C-REF-NO 003	YR 1968	DEPTH 255	WAVES 1 1123	AIR T 15.3	VIS - 9
CONS. NO 005	MONTH 10	MXSAMPD 02	WAVES 2 XX	WET B 14.8	STN
LAT 43-527N	DAY 20	NO.DPTH 10	WND-DIR 110	WW-CODE 63	
LON 62-530W	HR 22.2	W-COLOR	WND-SPD 11	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1002.5	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
222	0000	152 B	31988		2363	15043
222	0020	1510	31983		2365	15043
222	0030	0970	32270		2489	14863
222	0040	0447	32336		2565	14659
222	0060	0704	33468		2623	14782
222	0085	0732	33960		2658	14803
222	0110	0805	34337		2677	14841
222	0160	0903	34837		2701	14892
222	0210	0818	34794		2711	14868
222	0250	0772	34782		2716	14857

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1520 B	31988		2363	15043	0000	00000	4270
0010	1577 I	3202 I		2353	15063	0043	00002	4369
0020	1510	31983		2365	15043	0087	00009	4259
0030	0970	32270		2489	14863	0124	00018	3073
0050	0480 I	3286 I		2603	14681	0175	00038	1996
0075	0738 G	3383 I		2647	14802	0220	00066	1583
0100	0774	34198		2670	14825	0257	00099	1365
0125	0847 B	3453 C		2686	14862	0289	00136	1227
0150	0893 B	3477 B		2697	14886	0319	00178	1125
0175	0886 D	3485 G		2704	14888	0347	00224	1059
0200	0841 C	3482 E		2709	14875	0373	00274	1017
0225	0826 G	3486 I		2715	14874	0398	00329	0971
0250	0772	34782		2716	14857	0422	00388	0955



C-REF-NO 003	YR 1968	DEPTH 149	WAVES 1 1124	AIR T 15.7	VIS 9
CONS. NO 006	MONTH 10	MXSAMPD 01	WAVES 2 XX	WET B 15.1	STN
LAT 44-160N	DAY 21	NO.DPTH 7	WND-DIR 110	WW-CODE 63	
LON 63-190W	HR 01.2	W-COLOR	WND-SPD 10	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1002.0	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
012	0000	151 B	31383		2319	15033
012	0010	1488	31386		2324	15027
012	0020	1487	31389		2324	15029
012	0030	1371	32322		2420	15004
012	0050	0589	32338		2549	14719
012	0075	0470	32699		2591	14679
012	0100	0510	33252		2630	14707

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1510 B	31383		2319	15033	0000	00000	4693
0010	1488	31386		2324	15027	0047	00002	4649
0020	1487	31389		2324	15029	0094	00010	4647
0030	1371	32322		2420	15004	0136	00020	3735
0050	0589	32338		2549	14719	0198	00045	2508
0075	0470	32699		2591	14679	0257	00081	2109
0100	0510	33252		2630	14707	0305	00124	1739

C-REF-NO 003	YR 1968	DEPTH 92	WAVES 1 1024	AIR T 15.7	VIS 9
CONS. NO 007	MONTH 10	MXSAMPD 01	WAVES 2 XX	WET B 15.2	STN
LAT 44-240N	DAY 21	NO.DPTH 6	WND-DIR 070	WW-CODE 63	
LON 63-275W	HR 02.2	W-COLOR	WND-SPD 10	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 999.3	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
022	0000	145 B	31431		2335	15014
022	0010	1456	31440		2335	15018
022	0020	1454	31439		2335	15019
022	0030	1378	31446		2351	14996
022	0050	0841	32065		2493	14815
022	0075	0644	32329		2541	14745

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1450 B	31431		2335	15014	0000	00000	4537
0010	1456	31440		2335	15018	0046	00002	4545
0020	1454	31439		2335	15019	0091	00009	4544
0030	1378	31446		2351	14995	0136	00021	4392
0050	0841	32065		2493	14815	0211	00050	3037
0075	0644	32329		2541	14745	0281	00094	2583

C-REF-NO 003	YR 1968	DEPTH 3000	WAVES 1 0000	AIR T 18.0	VIS 8
CONS. NO 008	MONTH 10	MXSAMPD 10	WAVES 2 2921	WET B 16.8	STN
LAT 42-325N	DAY 29	NO.DPTH 13	WND-DIR 160	WW-CODE 02	
LON 61-240W	HR 05.0	W-COLOR	WND-SPD 09	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 1001.0	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
050	0000	173 B	35016		2547	15145
050	0010	1732	35007		2546	15147
050	0019	1735	35010		2546	15149
050	0029	1736	35044		2548	15151
050	0048	1746	35055		2546	15158
050	0073	1753	35432		2574	15168
050	0097	1629	35971		2644	15142
050	0146	1349	35505		2670	15055
050	0194	1272	35572		2691	15038
050	0292	1052	35307		2712	14974
050	0486	0636	34945		2748	14844
050	0730	0471	34932		2768	14818
050	0972	0431	34940		2773	14842

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1730 B	35016		2547	15145	0000	00000	2517
0010	1732	35007		2546	15147	0025	00001	2531
0020	1735	35013		2546	15149	0051	00005	2537
0030	1736	35042		2548	15152	0076	00012	2522
0050	1749	35074		2547	15159	0127	00033	2535
0075	1745	3548 C		2579	15167	0187	00071	2237
0100	1609 B	3597 H		2648	15136	0235	00113	1588
0125	1459 E	3580 I		2670	15091	0273	00156	1392
0150	1339 B	3550 C		2672	15053	0308	00205	1374
0175	1292 D	3552 I		2683	15041	0341	00260	1275
0200	1260	3556 B		2693	15035	0372	00320	1190
0225	1207 B	3551 G		2699	15020	0401	00384	1131
*0250	1151 B	3545 H		2705	15004	0429	00452	1082
0300	1032	35287		2714	14968	0482	00600	1004
0400	0803 E	3507 B		2735	14897	0574	00925	0813
0500	0619 B	3494 B		2750	14840	0648	01266	0667
0600	0526 F	3491 G		2759	14819	0711	01621	0582
*0700	0477 C	3492 C		2766	14815	0767	01993	0522
0800	0403 I	3486 I		2769	14800	0818	02387	0490

C-REF-NO 003	YR 1968	DEPTH 1000	WAVES 1 XX	AIR T 17.5	VIS 7
CONS. NO 009	MONTH 10	MXSAMPD 07	WAVES 2 XX	WET B 16.0	STN
LAT 42-518N	DAY 29	NO.DPTH 12	WND-DIR 140	WW-CODE 61	
LON 61-452W	HR 08.2	W-COLOR	WND-SPD 10	CLD-TPE 7	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 993.2	CLD-AMT 8	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
082	0000	137 B	32843		2460	15005
082	0010	1366	32831		2460	15005
082	0020	1365	32815		2459	15006
082	0030	1373	32845		2460	15011
082	0050	1608	34443		2532	15109
082	0075	1296	34999		2642	15020
082	0100	1381	35514		2664	15058
082	0150	1245	35529		2693	15021
082	0200	1091	35323		2706	14973
082	0300	0843	35081		2729	14896
082	0500	0530	34911		2759	14804
082	0750	0455	34903		2767	14814

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1370 B	32843		2460	15005	0000	00000	3343
0010	1366	32831		2460	15005	0034	00002	3347
0020	1365	32815		2459	15006	0067	00007	3359
0030	1373	32845		2460	15011	0101	00016	3355
0050	1608	34443		2532	15109	0162	00040	2677
0075	1296	34999		2642	15020	0216	00073	1639
0100	1381	35514		2664	15058	0255	00107	1435
0125	1340 H	3562 I		2681	15050	0289	00147	1283
0150	1245	35529		2693	15021	0320	00190	1173
0175	1168	3544 D		2701	14998	0349	00238	1104
0200	1091	35323		2706	14973	0376	00290	1056
0225	1022	3525 B		2712	14952	0402	00347	1000
0250	0958	3518 B		2718	14932	0426	00406	0947
0300	0843	35081		2729	14896	0472	00534	0848
0400	0657	3496 D		2747	14839	0549	00808	0686
0500	0530	34911		2759	14804	0613	01098	0571
0600	0455	3483 H		2762	14788	0669	01417	0548
0700	0440	3487 D		2766	14799	0723	01777	0519

C-REF-NO 003	YR 1968	DEPTH 100	WAVES 1 2123	AIR T 15.1	VIS B
CONS. NO 010	MONTH 10	MXSAMPD 01	WAVES 2 XX	WET B 14.0	STN
LAT 43-105N	DAY 29	NO.DPTH 6	WND-DIR 210	WW-CODE 01	
LON 62-059W	HR 10.6	W-COLOR	WND-SPD 10	CLD-TPE 6	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 991.2	CLD-AMT 5	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
106	0000	144 B	33376		2487	15035
106	0010	1433	33323		2484	15033
106	0020	1431	33392		2490	15035
106	0030	1431	33387		2490	15037
106	0050	1379	33389		2501	15023
106	0075	0901	34102		2643	14868

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1440 B	33376		2487	15035	0000	00000	3091
0010	1433	33323		2484	15033	0031	00002	3118
0020	1431	33392		2490	15035	0062	00006	3066
0030	1431	33387		2490	15037	0093	00014	3073
0050	1379	33389		2501	15023	0154	00039	2973
0075	0901	34102		2643	14868	0212	00074	1618



C-REF-NO 003	YR 1968	DEPTH 81	WAVES 1 2023	AIR T 14.5	VIS B
CONS. NO 011	MONTH 10	MXSAMPD 01	WAVES 2 XX	WET B 13.4	STN
LAT 43-285N	DAY 29	NO.DPTH 6	WND-DIR 210	WW-CODE 02	
LON 62-263W	HR 12.5	W-COLOR	WND-SPD 07	CLD-TPE 6	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 991.3	CLD-AMT 5	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
125	0000	134 B	32259		2421	14988
125	0010	1301	32217		2426	14976
125	0020	1268	32340		2442	14968
125	0030	1260	32328		2442	14967
125	0050	0798	33577		2618	14818
125	0075	0773	33683		2630	14814

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1340 B	32259		2421	14988	0000	00000	3715
0010	1301	32217		2426	14976	0037	00002	3674
0020	1268	32340		2442	14968	0073	00007	3525
0030	1260	32328		2442	14967	0109	00016	3522
0050	0798	33577		2618	14818	0163	00037	1852
0075	0773	33683		2630	14814	0208	00066	1742

C-REF-NO 003	YR 1968	DEPTH 265	WAVES 1 2534	AIR T 14.0	VIS 8
CONS. NO 012	MONTH 10	MXSAMPD 02	WAVES 2 XX	WET B 12.3	STN
LAT 43-527N	DAY 29	NO.DPTH 10	WND-DIR 260	WW-CODE 03	
LON 62-530W	HR 15.3	W-COLOR	WND-SPD 12	CLD-TPE 6	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 992.2	CLD-AMT 7	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
153	0000	133 B	32047		2407	14982
153	0010	1321	32055		2410	14981
153	0020	1325	32053		2409	14984
153	0030	1325	32053		2409	14985
153	0050	0649	33105		2602	14754
153	0075	0689	33765		2648	14782
153	0100	0650	34128		2682	14776
153	0150	0668	34739		2728	14799
153	0200	0882	34876		2707	14892
153	0250	0853	34883		2712	14889

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1330 B	32047		2407	14982	0000	00000	3852
0010	1321	32055		2410	14981	0039	00002	3831
0020	1325	32053		2409	14984	0077	00008	3842
0030	1325	32053		2409	14985	0116	00018	3845
0050	0649	33105		2602	14754	0175	00040	2006
0075	0689	33765		2648	14782	0220	00068	1568
0100	0650	34128		2682	14776	0255	00099	1251
0125	0639 B	3447 E		2711	14780	0283	00132	0983
0150	0668	34739		2728	14799	0306	00163	0827
0175	0778 I	3485 E		2721	14847	0328	00200	0903
0200	0882	34876		2707	14891	0352	00247	1040
0225	0834 I	3495 H		2720	14878	0377	00301	0920
0250	0853	34883		2712	14889	0401	00360	1000

C-REF-NO 003	YR 1968	DEPTH 145	WAVES 1 3021	AIR T 12.1	VIS 8
CONS. NO 013	MONTH 10	MXSAMPD 01	WAVES 2 2553	WET B 09.0	STN
LAT 44-160N	DAY 29	NO.DPTH 7	WND-DIR 300	WW-CODE 01	
LON 63-188W	HR 18.0	W-COLOR	WND-SPD 09	CLD-TPE 8	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 993.0	CLD-AMT 1	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
180	0000	123 B	31322		2370	14939
180	0010	1218	31334		2374	14937
180	0020	1212	31333		2375	14936
180	0030	1193	31387		2382	14932
180	0050	0495	32790		2595	14687
180	0075	0616	33557		2642	14750
180	0100	0634	33825		2660	14765

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1230 B	31322		2370	14939	0000	00000	4202
0010	1218	31334		2374	14937	0042	00002	4174
0020	1212	31333		2375	14936	0084	00009	4166
0030	1193	31387		2382	14932	0125	00019	4095
0050	0495	32790		2595	14687	0187	00042	2065
0075	0616	33557		2642	14750	0234	00072	1631
0100	0634	33825		2660	14765	0273	00106	1457

C-REF-NO 003	YR 1968	DEPTH 78	WAVES 1 2921	AIR T	VIS 8
CONS. NO 014	MONTH 10	MXSAMPD 01	WAVES 2 2553	WET B	STN
LAT 44-240N	DAY 29	NO.DPTH 6	WND-DIR 280	WW-CODE 01	
LON 63-275W	HR 18.9	W-COLOR	WND-SPD 07	CLD-TPE 8	
MARSD SQ 151	C/I 1810	W-TRNSP	BARO 997.8	CLD-AMT 1	HW

## O B S E R V E D

GMT	DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND
189	0000	101 B	31754		2443	14866
189	0010	0934	31867		2464	14841
189	0020	0697	32281		2531	14757
189	0030	0448	32585		2584	14661
189	0050	0500	32746		2591	14688
189	0075	0468	33087		2622	14684

## I N T E R P O L A T E D

DEPTH	T E M P	S A L	OXYGEN	SGMT	SOUND	DELTA-D	POT.EN	SVA
0000	1010 B	31754		2443	14866	0000	00000	3513
0010	0934	31867		2464	14841	0034	00002	3313
0020	0697	32281		2531	14757	0064	00006	2678
0030	0448	32585		2584	14661	0089	00012	2169
0050	0500	32746		2591	14688	0132	00030	2103
0075	0468	33087		2622	14684	0181	00061	1815

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7	Davis Strait and Northern Labrador Sea	10-65-001
8	Gulf of St Lawrence and Scotian Shelf (Restricted)	10-67-007

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